

# 9th Class 2015

Biology	Group-I	Paper-I
Time: 2.45 Hours	(Subjective Type)	Marks: 63

(Part-I)

**Q.2. Write short answers to any Five (5) question. (10)**

(i) Define parasites and give an example.

**Ans** → **Parasites:**

Parasites are the organisms that take food and shelter from living hosts and, in return, harm them.

**Example:**

Leech and tapeworm are parasites.

(ii) Differentiate between morphology and anatomy.

**Ans** →

Morphology	Anatomy
This branch deals with the study of form and structures of living organism.	The study of internal structures is called anatomy.

(iii) Define theory and give an example.

**Ans** → The hypotheses that stand the test of time (often tested and never rejected), are called theories. A theory is supported by a great deal of evidence. Hardy-Weinberg law is an example of it.

(iv) Write down two characteristics of good hypothesis.

**Ans** → **Two characteristics of good hypothesis:**

- 1- It should be a general statement.
- 2- It should be a tentative idea.

(v) Write two points on the importance of biodiversity.

**Ans** → **Importance of Biodiversity:**

- 1- Biodiversity provides food for human.
- 2- Biodiversity plays important role in making and maintaining ecosystems.



(vi) Name any four taxa of classification.

**Ans** Four taxa of classification:

**Phylum:** A phylum is a group of related classes.

**Class:** A class is a group of related orders.

**Order:** An order is a group of related families.

**Family:** A family is a group of related genera.

(vii) Define cell cycle.

**Ans** Cell Cycle:

Cell cycle is the series of events from the time a cell is produced until it completes mitosis and produces new cells. Cell cycle consists of two major phases i.e., interphase and mitotic phase (M phase).

(viii) Differentiate between somatic cells and gamete.

**Ans** Somatic cells are those which form the body of organisms, while germ line cells are those which give rise to gametes. Somatic cells undergo mitosis while germ line cells undergo meiosis.

**Q.3. Write short answers to any Five (5) questions. (10)**

(i) Write difference between primary and secondary cell wall.

**Ans** The primary layer of cell wall is called primary wall, which is further strengthened by an additional layer called secondary wall. It is comparatively thicker than primary wall.

(ii) What are Lysosomes? Give their function.

**Ans** Lysosomes and its function:

These are single-membrane bound organelles. Lysosomes contain strong digestive enzymes and work for the breakdown (digestion) of food and waste materials within cell. During its function, a lysosome fuses with the vacuole that contains the targeted material and its enzymes break down the material.

(iii) Write function of xylem and phloem tissues.

**Ans** Xylem tissue is responsible for the transport of water and dissolved substances from roots to the aerial



parts. Xylem tissue also provides support to plant body. Phloem tissue is responsible for the conduction of dissolved organic matter (food) between different parts of plant body.

**(iv) What is activation energy? Write its role in enzyme action.**

**Ans** All chemical reactions require activation energy. It is defined as minimum energy required to start a reaction. The need for activation energy acts as a barrier to the beginning of reaction. Enzymes lower such barriers by decreasing the requirement of activation energy. Thus, in the presence of enzymes, reactions proceed at a faster rate.

**(v) What are co-enzymes? Give their function.**

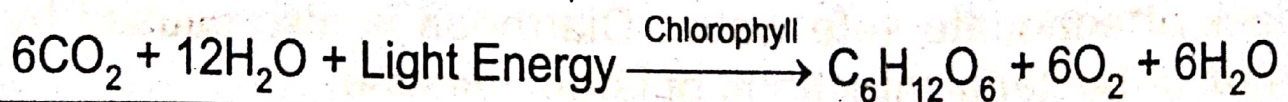
**Ans** If organic co-factors are loosely attached with enzyme, they are called co-enzymes. Co-enzymes transport chemical groups from one enzyme to another.

**(vi) What is meant by enzyme active site? Give its role in enzyme activity.**

**Ans** Only a small portion of enzyme molecule is directly involved in catalysis. This catalytic region is known as active site. It recognizes and binds substrate and then carries out reaction.

**(vii) Write a simple and complete equation for the process of photosynthesis.**

**Ans** A simple general equation for photosynthesis is as follows:



**(viii) What is difference between aerobic and anaerobic respiration?**

**Ans** The cellular respiration occurring in the presence of oxygen is called aerobic respiration, while the one that occurs in the absence of oxygen is called anaerobic respiration.



**Q.4. Write short answers to any Six (6) questions. (12)**

(i) What are the sources of vitamin-D?

**Ans** Vitamin-D is mainly found in fish liver oil, milk ghee and butter, etc. It is also synthesized by skin when ultraviolet (UV) radiations from the Sun are used to convert a compound into vitamin-D.

(ii) What is meant by dietary fibre?

**Ans** Dietary fibre:

Dietary fibre (also known as "roughage") is the part of human food that is indigestible. It is found only in plant foods and it moves undigested through stomach and small intestine and into colon.

(iii) What is the function of Iron and Calcium in human diet?

**Ans** Calcium is essential for the development and maintenance of bones and teeth. It is also needed for maintaining cell membranes and connective tissues and for the activation of several enzymes. Calcium also aids in blood clotting. Iron plays a major role in oxygen transport and storage. Cellular energy production also requires iron. Iron also supports immune function.

(iv) What is diarrhoea? Write its two causes.

**Ans** Diarrhoea is a condition in which the sufferer has frequent watery, loose bowel movements. This condition may be accompanied by abdominal pain, nausea and vomiting. It occurs when required water is not absorbed in blood from colon. The main cause of diarrhoea includes lack of adequate safe water. Diarrhoea is also caused by viral or bacterial infections of large intestine.

(v) Patients bleed from the nose, gums and under the skin in dengue fever. Give reason.

**Ans** In dengue fever, there is a sharp decrease in the number of platelets in blood. Because of this, patients bleed from the nose, gums and under the skin.



(vi) Define myocardial infarction.

**Ans** Myocardial Infarction:

The term myocardial infarction is derived from myocardium (the heart muscle) and infarction (tissue death). It is more commonly known as a heart attack. It occurs when blood supply to a part of heart is interrupted and leads the death of heart muscles. Heart attack may be caused by blood clot in coronary arteries. It is a medical emergency, and the leading cause of death for both men and women all over the world.

(vii) Write causes of cardiovascular disorders.

**Ans** The risk factors that lead to cardiovascular disorders include advanced age, diabetes, high blood concentration of low-density lipids (e.g. cholesterol) and triglycerides, tobacco smoking, high blood pressure (hypertension), obesity and sedentary lifestyle.

(viii) Differentiate between pericardium and pericardial fluid.

**Ans** Heart is enclosed in a sac known as pericardium. There is a fluid, known as pericardial fluid, between pericardium and heart walls. It reduces friction between pericardium and heart, during heart contractions.

(ix) Why O blood group individuals are called universal donors?

**Ans** O blood group individuals are called universal donors because both antigens A and B are absent in their blood. Therefore, they can donate blood to the recipients of every other blood group.

(Part-II)

**Note:** Attempt any Three (3) questions.

**Q.5.(a)** Describe the significance of binomial nomenclature with examples. (3)

**Ans** The method of giving scientific names to living organisms is called as 'binomial nomenclature'. According



to this method, each organism has two words name. The first of which is genus while the second is the name of the species. Binomial nomenclature was first introduced by Carolus Linnaeus, a Swedish biologist.

### **Importance of Binomial Nomenclature:**

The same organism has different names at the same place or at different places. For example, 'piaz' has different names like onion, gandrah, bassal, vassal etc. in different parts of the same country. However, its scientific name is 'Allium cepa' which is acceptable everywhere throughout the world. The common names have no scientific basis. For example, fish is a vertebrate and has different names like starfish, cray fish, silver fish and so on. These names produce confusion. So to avoid confusion, scientific names are given to the organisms.

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**(b) Write a comprehensive note on farming and forestry. (4)**

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#### **Ans** Farming:

It deals with the development and maintenance of different types of farm. For example in some farms animal breeding technologies are used for the production of animals which are better protein and milk source. In poultry farms chicken and eggs are produced. Similarly in fruit farms, different fruit yielding plants are grown. A student who has gone through the professional course of agriculture, animal husbandry or fisheries etc. can adopt this profession.

#### **Forestry:**

In forestry, professionals look after natural forests and advise to the government for planting and growing artificial forests. Many universities offer professional courses in forestry after the higher secondary education in biology or after bachelor level study of zoology and botany.



**Q.6.(a) Write three main principles / postulates of cell theory. (3)**

**Ans** In 1838-39, two German biologists Schleiden (botanist) and Schwann (zoologist) presented cell theory. The important postulates of the modern cell theory are as follows:

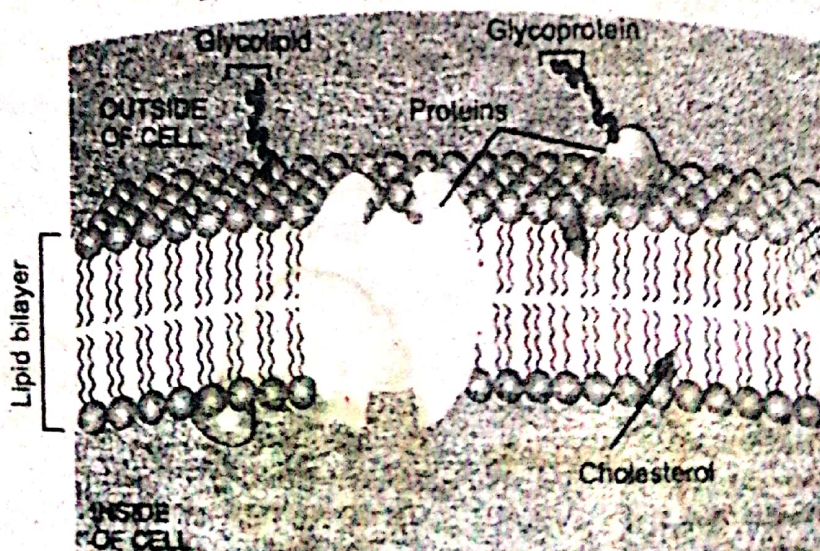
- (i) All organisms are composed of one or more cells.
- (ii) Cells are the smallest living things, the basic unit of organization of all organisms.
- (iii) Cells arise only by divisions in previously existing cells.

**(b) Explain the structure of cell membrane with diagram. (4)**

**Ans** Cell membrane is mainly composed of proteins and lipids with small quantities of carbohydrates. Electron microscopic examinations of cell membranes have led to the development of fluid-mosaic model of cell membrane.

According to this model, there is a lipid bilayer in which the protein molecules are embedded. The lipid bilayer gives fluidity and elasticity to membranes. Small amounts of carbohydrates are also found in cell membranes. These are joined with proteins or lipids of membrane. In eukaryotic cells, cholesterol is also present in lipid bilayer.

In eukaryotic cell many organelles e.g., mitochondria, chloroplasts, Golgi apparatus, and endoplasmic reticulum are also bounded by cell membranes.

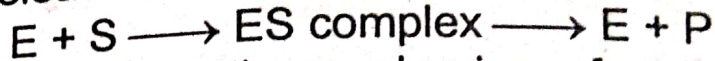




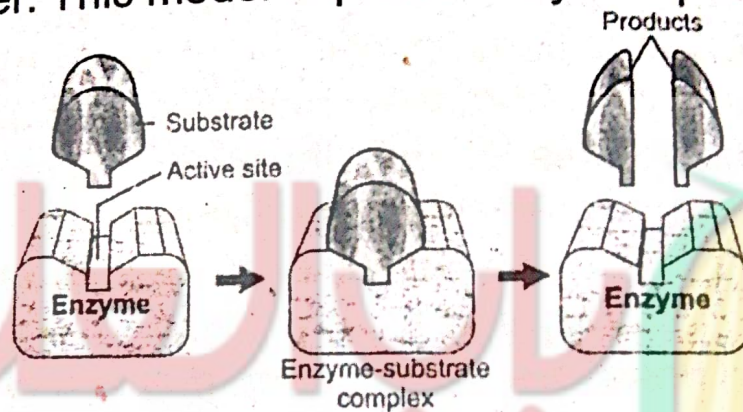
**Q.7.(a) Explain the mechanism of enzyme action. (3)**

**Ans** Mechanism of Enzyme Action:

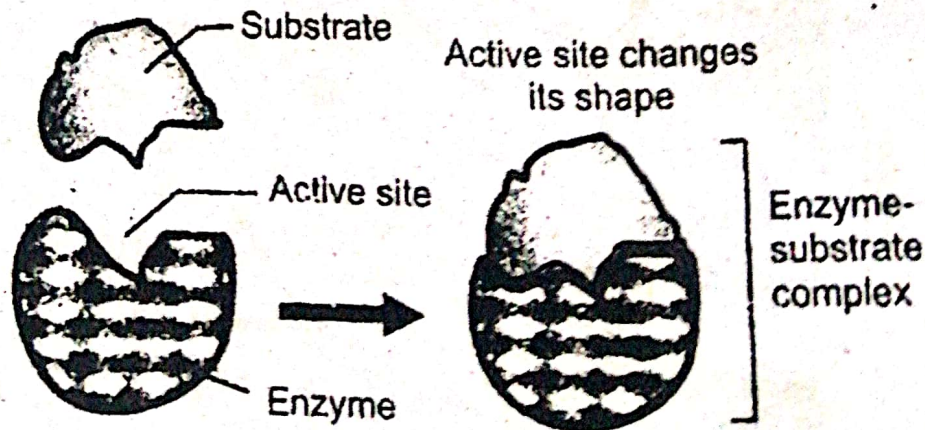
When enzyme attaches with substrate, a temporary enzyme-substrate (ES) complex is formed. Enzyme catalyzes the reaction and substrate is transformed into product. After it, the ES complex breaks and enzyme and product are released.



In order to explain the mechanism of enzyme action, a German chemist Emil Fischer, in 1894, proposed "lock and key" model. According to this model, both enzyme and substrate possess specific shapes that fit exactly into one another. This model explains enzyme specificity.



In 1958, an American biologist Daniel Koshland suggested a modification to lock and key model and proposed induced-fit model. According to this model, active site is not a rigid structure rather it is molded into the required shape to perform its function. Induced-fit model is more acceptable than "lock and key" model of enzyme action.





**(b) Describe prophase of mitosis in detail. (4)**

**Ans** Prophase is the longest phase of mitosis. The important changes which take place during prophase are as follows:

- (i) The nuclear material is in the form of loose thread-like structures called as 'chromatin'. The chromatin is condensed into highly ordered structures called as chromosomes. Each chromosome is made of two sister chromatids bonded together by centromere.
- (ii) Nuclear membrane disintegrates and nucleoli disappear.
- (iii) There are two centrioles (collectively called as centrosome) close to the nucleus. Each centriole duplicates and two daughter centrosomes are formed. Both the centrosomes move towards the opposite poles of the cell. These centrosomes form spindle fibers. In plants, the centrioles are absent. So the spindle fibers are formed by the aggregation of tubulin proteins on the surface of nuclear envelope during prophase.

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**Q.8.(a) Describe two important diseases due to protein energy malnutrition. (3)**

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**Ans** **Protein-Energy Malnutrition:**

Protein-energy malnutrition means inadequate availability or absorption of energy and proteins in the body. It is the leading cause of death in children in developing countries. It may lead to diseases such as Kwashiorkor and marasmus.

**1- Kwashiorkor:**

Kwashiorkor is due to protein deficiency at the age of about 12 months when breastfeeding is discontinued. It can also develop at any time during a child's growing years. Children may grow to normal height but are abnormally thin.



## 2- Marasmus:

Marasmus usually develops between the ages of six months and one year. Patients lose all their body fat and muscle strength, and acquire a skeletal appearance. Children with marasmus show poor growth and look small for their age.

(b) Describe digestion and absorption in small intestine. (4)

**Ans** Digestion and absorption in small Intestine:

### Duodenum:

Duodenum comprises of the first 10 inches (25 cm) of small intestine and it is the part of alimentary canal where most of the digestive process occurs. Here, food is further mixed with 3 different secretions:

#### 1- Bile:

Bile from liver helps in the digestion of lipids through emulsification i.e., by keeping the lipid droplets separate from one another.

#### 2- Pancreatic juice:

Pancreatic juice from pancreas contains enzymes trypsin, pancreatic amylase and lipase which digest proteins, carbohydrates and lipids respectively.

#### 3- Intestinal juice:

Intestinal juice from intestine walls contains many enzymes for the complete digestion of all kinds of food.

Next to the duodenum is 2.4 meters long jejunum. It is concerned with the rest of the digestion of proteins, carbohydrates and lipids of our bite.

Last 3.5 meters long part of small intestine is ileum. It is concerned with the absorption of digested food. There are circular folds in the inner wall of ileum. These folds have numerous finger-like projections called villi (singular: villus). Villi increase the surface area of the inner walls and help a lot in the absorption of digested food. Each villus is richly supplied with blood capillaries and a vessel of



lymphatic system, called lacteal. The walls of villus are only single-cell thick. The digested molecules i.e., simple sugars and amino acids are absorbed from intestine into the blood capillaries present in villi. Blood carries them away from small intestine via the hepatic portal vein and goes to liver for filtering. Here, toxins are removed and extra food is stored.

**Q.9.(a) Compare photosynthesis and respiration. (3)**

**Ans**

Characteristics	Photosynthesis	Respiration
Metabolism	Anabolism	Catabolism
Energy investment / production:	Investment of light energy to store it in the form of bond energy.	Bond energy transformed into chemical energy of ATP.
Organisms capable of:	Some bacteria, all algae all plants.	All organisms
Site of occurrence:	Chloroplasts	In cytoplasm and mitochondria
Time of occurrence:	In daytime only, in the presence of light.	All the time

**(b) Where red blood cells are formed in human? Describe their structure and function. (4)**

**Ans**

**Red Blood Cells (Erythrocytes):**

These are the most numerous of blood cells. A cubic millimeter of blood contains 5 to 5.5 million of RBCs in males, and 4 to 4.5 million in females. When RBCs are formed, they have nucleus. In mammals, when a red blood cell matures, its nucleus is lost. After the loss of nucleus, RBC enters blood. About 95% of the cytoplasm of RBCs is filled with hemoglobin, which transports  $O_2$  and small amounts of  $CO_2$ . The remaining 5% consists of enzymes, salts and other proteins. RBCs are biconcave and have an elastic cell membrane. In the embryonic and foetal life,



they are formed in liver and spleen. In adults, they are formed in the red bone marrow of short and flat bones, such as sternum, ribs and vertebrae. Average life span of RBC is about four months (120 days) after which it breaks down in liver and spleen by phagocytosis.

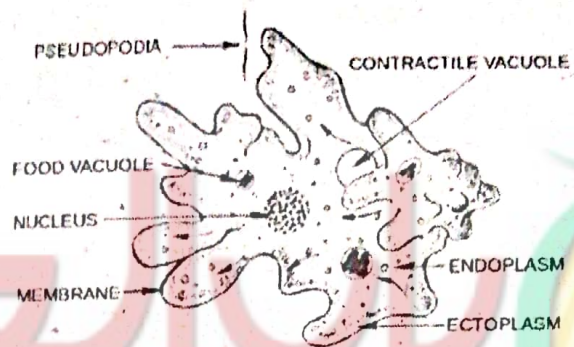
(Part-III)

(Practical Part)

Note: Attempt any Two (2) questions.

A-(i) Draw a diagram of amoeba observed by microscope and label its two parts. (3)

Ans



Structure of Amoeba.

(ii) Write two characteristics of amoeba. (2)

Ans Characteristics:

- (i) Amoeba is unicellular eukaryote and has an irregular shape, which continuously changes due to thin and flexible cell membrane.
- (ii) It has finger-like projections called pseudopodia (singular: pseudopodium) which help in movement and intake of food.

B-(i) You have observed that  $\text{CO}_2$  is necessary for photosynthesis. Write its procedure. (3)

Ans Procedure:

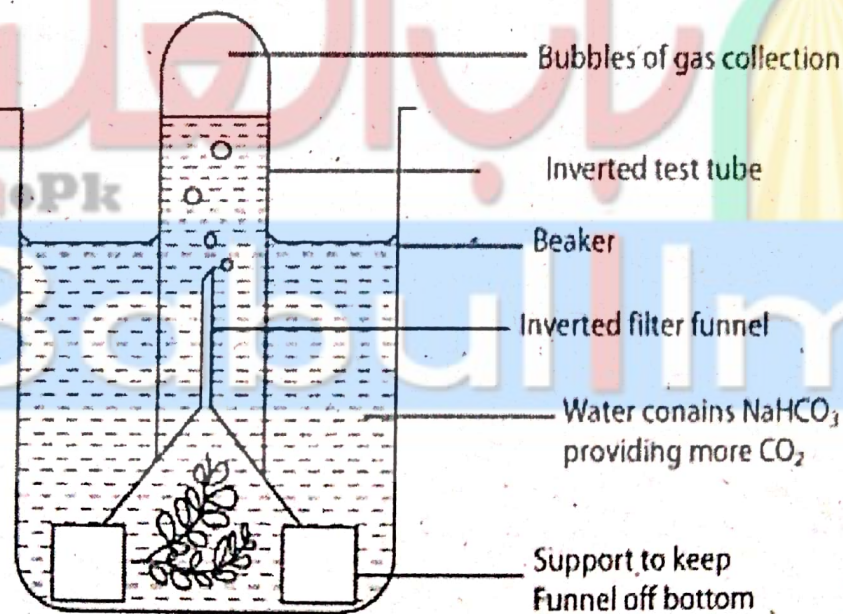
1. De-starch the potted plant by placing it in a dark place for about 2-3 days.



2. Add potassium hydroxide solution into the wide mouth bottle (KOH will absorb all the  $\text{CO}_2$  present in the bottle).
3. Cut a cork lengthwise into two pieces.
4. Pass leaf of the potted plant (without detaching) through the cut section of the cork in such a way that half portion of the leaf remains out of the bottle.
5. Make the apparatus airtight by applying vaseline on the cuttings of cork.
6. Place the apparatus in bright sunlight for a few hours for photosynthesis.
7. Remove this leaf from the plant.
8. Apply starch test to the leaf.

(ii) You examined the process of photosynthesis using aquatic plant hydrilla. Draw the diagram of the experiment. (2)

**Ans**



Experiment setup to demonstrate photosynthesis in an aquatic plant.

C-(i) You have observed iodine test for non-reducing sugar. Write its procedure, (3)

**Ans**

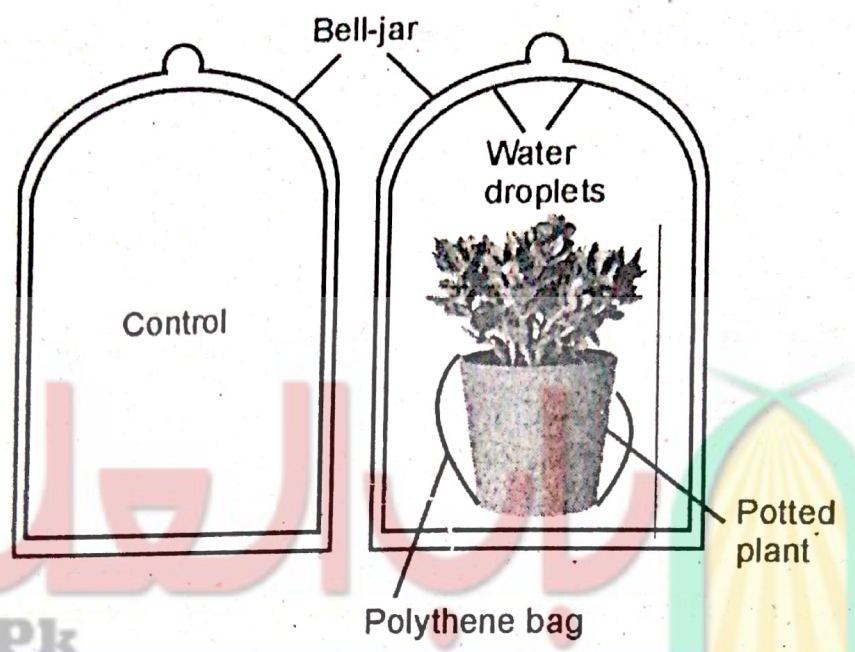
**Iodine test for Starch:**

1. Take 2 ml of starch solution in a test tube and pour few drops of iodine solution to it.
2. Record observation of the reaction.



(ii) You have observed the process of transpiration using bell jar. Draw its labeled diagram. (2)

**Ans** →



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